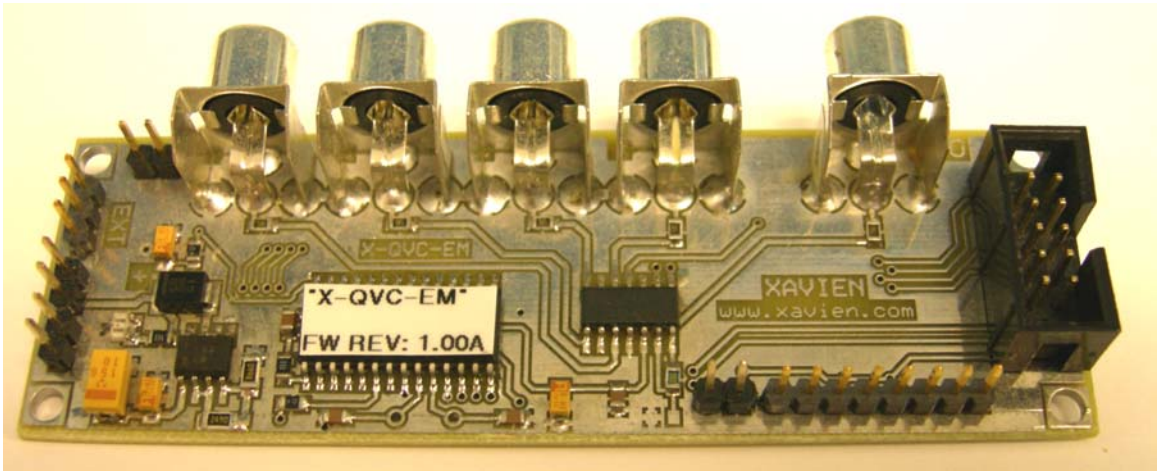
“X-QVC-EM” – XAVIEN - Quad Video Controller – Engineering Module

User Manual and Instructions



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System Overview

The “X-QVC-EM” is a low cost 4-channel video multiplexer that was designed to allow the integration and control of up to 4 video sources, these include cameras, RF video receivers and RF video transmitters. The “X-QVC-EM” can either *“scan”* through each video channel sequentially or can be set to a specific video channel locally (buttons / switches or RC receiver). When the “X-QVC-EM” is set to *“MANUAL”* mode the user selects the video source by pressing the corresponding button or setting the *“EXT CTRL”* bits. In “SCAN” mode the “X-QVC-EM” switches between each video channel, starting with CH1, for a period of time set by the user (1s to 16s in 1s increments). The “X-QVC-EM” has an input capacitance of 1pF whether the channel is on or off providing a predictable input impedance to the signal source. Input and output ports have all been optimized for 75 ohm, but will work with a wide range of inputs. The output is capable of driving a 150 ohm load to within 730mV of the +5V power rails. DC input voltage can range from +7V to +30V when using the “UNREG-DC” input. Camera connections are made using “RCA” style connectors. This unit was designed to be used as a stand alone unit connected to an external control system or mounted in a box as an independent system.

Specifications

DC INPUT	“UNREG-DC” INPUT: +7V to +30V “+5V” INPUT: +4.75V to +5.25V
Dimensions	1.25” W x 3.8” L
Video I/O Connectors	RCA
Camera Input	1Vp-p, 75 oh
Adjustable Dwell Time	1s to 16s (in 1s increments)

Operational Overview

Figure 1 shows the “X-QVC-EM” assembly. There are 7 connectors used for interfacing to the outside world. The “+5V” input connector should have +5V (+4.75V to +5.25V) and ground applied to it. The “UNREG-DC” input connector can have a DC voltage ranging from +7V to +30V applied since the “X-QVC-EM” has an onboard voltage regulator. **ONLY one of the DC supplies should be used at a time, do not attempt to power both connectors with a voltage.** If you are using the “UNREG-DC” input you can power an external circuit off of the “+5V” input line as long as your load **DOES NOT exceed 50mA.**

FIGURE 1. “X-QVC-EM” Assembly

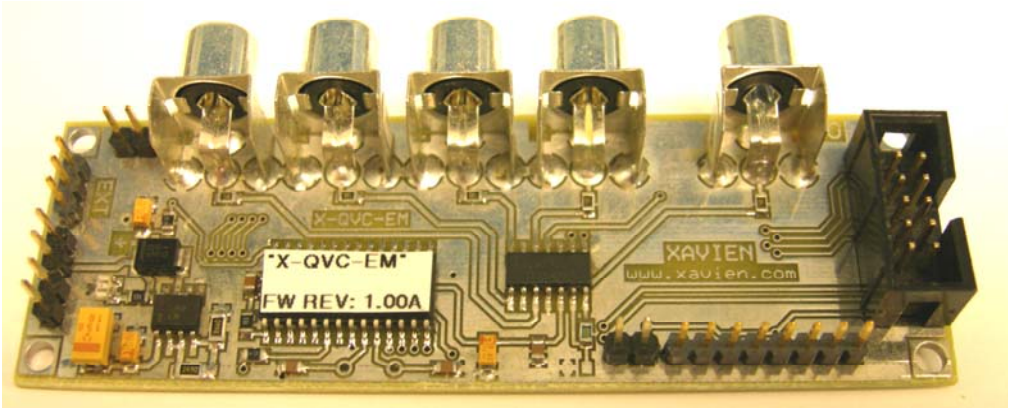
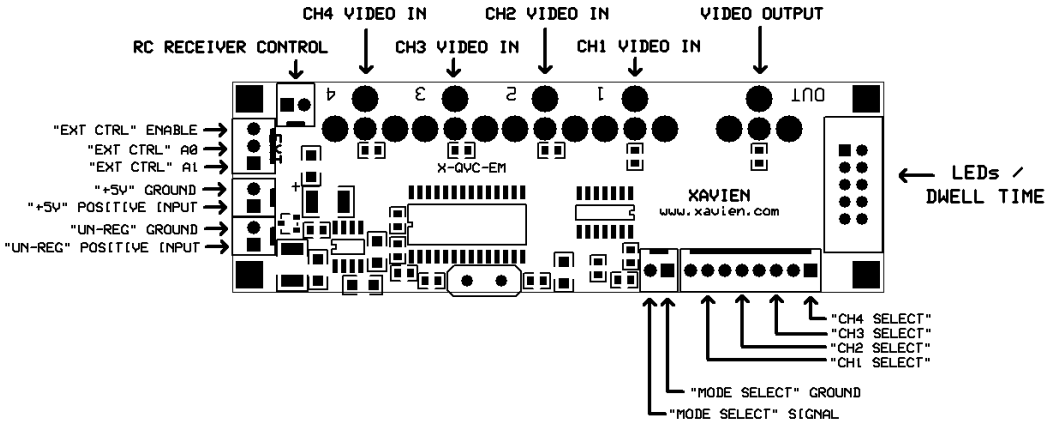


Figure 2 lists all associated connections on the "X-QVC-EM" and their functions.

FIGURE 2. Connections of "X-QVC-EM"



Control Interface Description:

- To activate ***"RC RECEIVER CONTROL"*** mode place the included 2 pin jumper across the "RC RECEIVER CONTROL" connector (to get out of this mode, remove jumper and turn DC power to unit off). Connect the output of your RC receiver to the ***"EXT CTRL"*** connector with the signal (yellow or white wire) going to the ***"EXT CTRL ENABLE"*** pin. **Table 1**. shows the truth table for using the ***"RC RECEIVER CONTROL"*** mode.

Pulse Time:	Video Channel Selected:
1.0ms to 1.25ms *(Ideal: 1.1ms)*	1
1.26ms to 1.5ms *(Ideal: 1.4ms)*	2
1.51ms to 1.75ms *(Ideal: 1.6ms)*	3
1.76ms to 2.0ms *(Ideal: 1.9ms)*	4

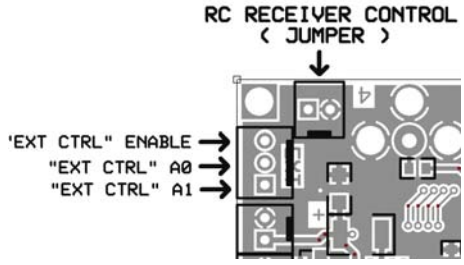
***** NOTE:*** When the unit is in RC Receiver Control mode and the unit looses RC Signals, the "X-QVC-EM" stays at the last video channel selected.

- ***"EXT CTRL"*** (with the ***"RC RECEIVER CONTROL"*** jumper removed from unit) is used to connect to an external controller for video channel select, sets the unit into *"LOCAL"* control or *"REMOTE"* mode. In *"LOCAL"* control the system is controlled through the other connections, ***"MODE SELECT", "CHANNEL SELECT"*** and ***"LED / DWELL TIME"***. In *"LOCAL"* control the unit has two modes of operation (depending on the ***"MODE SELECT"*** input), *"MANUAL***"** and *"SCAN".* When unit is put into *"REMOTE"* mode it ignores all other functions except the "EXT CTRL" A0 / A1 signals. **Table 2** shows logic levels needed to control the "EXT CTRL" functions on the "X-QVC-EM" (1 = TTL Hi, 0 = TTL Low) ***(X = Don't Care).*** **Figure 3** shows the pin out of the "EXT CTRL" connector.

TABLE 2. "EXT CTRL" Truth Table

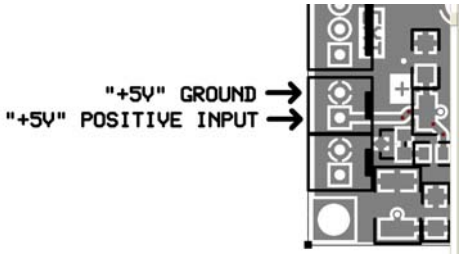
ENABLE	A0	A1	*CH Selected*
0	**X**	**X**	**X ("LOCAL" MODE)**
1	**0**	**0**	**CH1**
1	**1**	**0**	**CH2**
1	**0**	**1**	**CH3**
1	**1**	**1**	**CH4**

FIGURE 3. “EXT CTRL” pin out



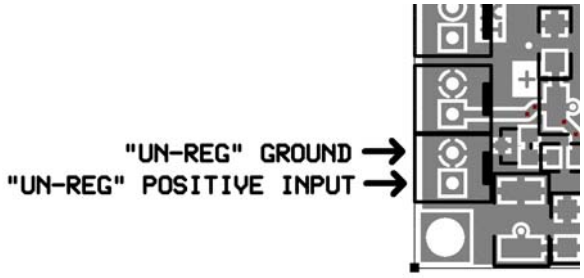
- ***“+5V”*** is used to power the “X-QVC-EM”, range is from +4.75V to +5.25V DC. **Figure 4** shows the ***“+5V”*** input connector pin out.

FIGURE 4. “+5V” input pin out



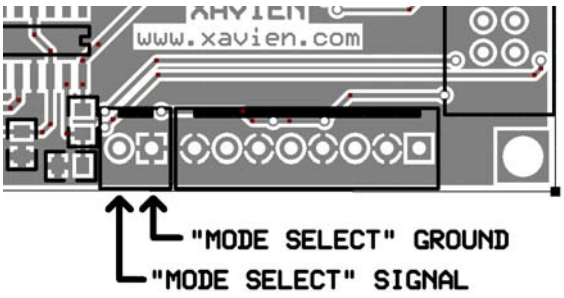
- ***“UN-REG”*** input is used to power the “X-QVC-EM”, range is from +7V to +30V DC. **Figure 5** shows the ***“UN-REG”*** input connector pin out.

FIGURE 5. “UN-REG” input pin out



- ***“MODE SELECT”*** is used to put the “X-QVC-EM” in either *“MANUAL”* or *“SCAN”* mode. **Figure 6** shows the ***“MODE SELECT”*** connector pin out.

FIGURE 6. “MODE SELECT” input pin out

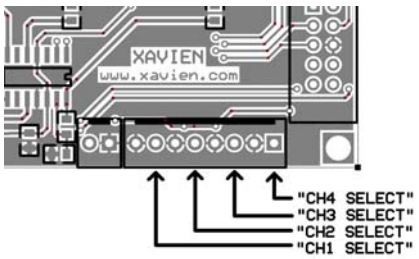


- ***"CH4 VIDEO IN"*** is used for video signal input (center conductor = *video signal*).
- ***"CH3 VIDEO IN"*** is used for video signal input (center conductor = *video signal*).
- ***"CH2 VIDEO IN"*** is used for video signal input (center conductor = *video signal*).
- ***"CH1 VIDEO IN"*** is used for video signal input (center conductor = *video signal*).
- ***"VIDEO OUTPUT"*** is used for video signal output (center conductor = *video signal*).
- ***"CHANNEL SELECT"*** is used to manually select video channels. The ***"CHANNEL SELECT"*** interface was designed to allow the user to easily connect momentary switches for selecting a specific channel. To select a specific channel the "CHx SELECT" pin must see a momentary TTL logic low (or momentarily short that pin to ground). **Table 3** shows logic levels needed to control the ***"CHANNEL SELECT"*** functions of the "X-QVC-EM" (1 = TTL Hi, 0 = TTL Low) ***(X = Don't Care).*** **Figure 7** shows the pin out of the "CHANNEL SELECT" connector. **Pins 2, 4, 6, and 8 are all tied to GROUND.**

TABLE 3. "CHANNEL SELECT" Truth table

CHANNEL SELECTED	CH1 LOGIC LEVEL	CH2 LOGIC LEVEL	CH3 LOGIC LEVEL	CH4 LOGIC LEVEL
1	0	1	1	1
2	1	0	1	1
3	1	1	0	1
4	1	1	1	0

FIGURE 7. "CHANNEL SELECT" input pin out



- ***"LEDs / DWELL TIME"*** is used to connect 4 LEDs and set "DWELL TIME". The LED indicators can also be used as feedback to an external controller to monitor what channel is selected. **Figure 8** shows the pin out of the ***"LED / DWELL TIME"*** connector. **Table 4** shows logic levels needed to control the "DWELL TIME" functions on the "X-QVC-EM" (1 = TTL Hi, 0 = TTL Low) ***(X = Don't Care).*** Default DWELL TIME is 16s.

FIGURE 8. "LED / DWELL SETTING" connector pin out

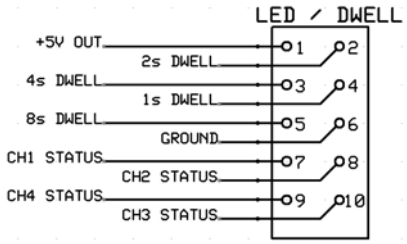


TABLE 4. "LED / DWELL TIME" Truth table, setting DWELL TIME

DWELL TIME	1s DWELL	2s DWELL	4s DWELL	8s DWELL
1s	**1**	**0**	**0**	**0**
2s	**0**	**1**	**0**	**0**
3s	**1**	**1**	**0**	**0**
4s	**0**	**0**	**1**	**0**
5s	**1**	**0**	**1**	**0**
6s	**0**	**1**	**1**	**0**
7s	**1**	**1**	**1**	**0**
8s	**0**	**0**	**0**	**1**
9s	**1**	**0**	**0**	**1**
10s	**0**	**1**	**0**	**1**
11s	**1**	**1**	**0**	**1**
12s	**0**	**0**	**1**	**1**
13s	**1**	**0**	**1**	**1**
14s	**0**	**1**	**1**	**1**
15s	**1**	**1**	**1**	**1**
16s	**0**	**0**	**0**	**0**

"CH1 STATUS", ***"CH2 STATUS"***, ***"CH3 STATUS"*** and ***"CH4 STATUS"*** can be used as indicators for monitoring selected channel. Each line has a series resistor (680 ohm) for current limiting. You can also connect the *anode* of an LED directly to each status line for visible indication. You can also connect the status lines directly to I/O lines of a MCU for system monitoring.

"LOCAL" CONTROL:

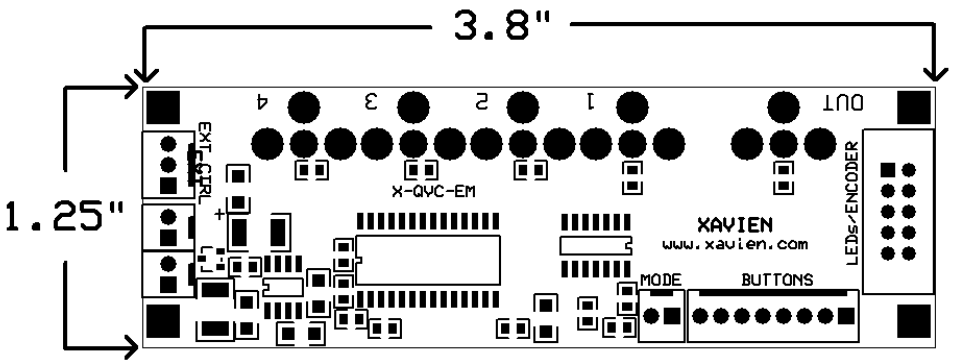
When the **ENABLE** pin of the ***"EXT CTRL"*** input is left "OPEN" or placed at a LOGIC LEVEL 0 the "X-QVC-EM" enters into the ***"LOCAL" CONTROL*** operation. When in ***"LOCAL" CONTROL*** there are two modes of operation, ***"MANUAL"*** and ***"SCAN".***

- **"MANUAL" Mode:**
  "MANUAL" mode is used to continuously view a specific channel. Once "X-QVC-EM" powers up and senses "MANUAL" mode has been selected, CH1 is selected by default. The unit will keep CH1 selected until the user selects a different channel.

- **"SCAN" Mode:**
  This mode allows the user to sequentially scan through each channel. The dwell time for each channel is set by the user in 1s increments (1s MIN to 16s MAX). While the unit is scanning the user can select a specific channel, the unit will stay on that channel as long as the user has it selected.

Mounting / Installation

The “X-QVC-EM” comes standard with the following 0.1” (2.54mm) headers: 4x 2-pin, 1x 3-pin, 1x 8-pin and 1x 5x2 (10) pin. The headers are **NOT** soldered to the PCB; this allows the user to install the connectors on the top or bottom of the PCB. This also allows the user to place a different style of connector on the board or install wires directly to the PCB. All mounting holes are 0.125” in diameter.



* Handling Precautions **

These units are sensitive to damage from ESD and should always be handled in a properly grounded environment; damage from ESD is not covered under the warranty.

!! Product Disclaimer and Limit of Liability !!

Since the use and application of this equipment are beyond our control, the purchaser or user agrees to hold “XAVIEN” and their agents from any and all legal claims, demands, actions, debts, liabilities, judgments, costs and attorney fees arising out of, claimed on account of, or in any manner predicted upon loss or damage to property of, or injuries to or death of, any and all persons arising out of the use of this equipment. Due to the nature of electronic devices, the application and environments for these devices, the possibility of failure can never be completely ruled out. It is the responsibility of the purchaser or user of this equipment to properly test and simulate the actual conditions under which the device is intended to be used to ensure the highest degree of reliability, safety and success.

!! Product Warranty !!

The “X-QVC-EM” has a warranty of 1 year starting from date of purchase as long as all the guidelines have been followed that are outlined is this document. Any improper use or carelessness on the part of user will void the warranty. If your unit has problems send an email to:

RMA@XAVIEN.COM

Once this has been done, XAVIEN will send you a return material authorization (RMA) number that you need to include with your unit. **DO NOT send any units back to XAVIEN without this RMA number, if we receive product with no RMA it will NOT be accepted and mailed back unrepaired.**

Revision History

PCB REV: 1.00A	DATE: 07/15/2007
DOC REV: 1.00A	DATE: 07/15/2007
FW REV: 1.00A	DATE: 07/15/2007